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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/828,067	04/06/2001	Don E. Curry	005040/TCG/PMD/LE	7268
32588	7590	06/03/2005	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/828,067

Applicant(s)

CURRY ET AL

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-35 and 38-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-35 and 38-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                         |                                                                             |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____                                                             | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 29, 30, 31, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itsudo et al (JP05-198512) in view of Hsieh; Chung-Ju et al. (US 6860138 B1). Itsudo teaches:
  - i. A wafer (2; Figure 6) processing apparatus (Figure 6, 8; abstract), comprising: a processing chamber (1; Figure 6; abstract) defined by a lower wall, an upper wall (8; Figure 6) and side walls extending from the lower wall to the upper wall (8; Figure 6), a wafer (2; Figure 6) supply opening (not shown; inherent) being formed in one of the walls for transferring a wafer (2; Figure 6) into the chamber (1; Figure 6; abstract); a susceptor (6; Figure 1) in the chamber (1; Figure 6; abstract) on which the wafer (2; Figure 6) can be located so that an upper surface of the wafer (2; Figure 6) faces the upper wall (8; Figure 6); a manifold (9; Figure 6) component located on the chamber (1; Figure 6; abstract) and, together with the upper surface of the upper wall (8; Figure 6), defining a manifold cavity (9; Figure 6); an exhaust line (4; Figure 6) connected to the chamber (1; Figure 6; abstract), for flowing a gas from the chamber (1; Figure 6; abstract), connected such that the gas has a tendency to flow toward the exhaust line (4; Figure 6); and a gas supply line (12; Figure 6) connected to the manifold (9; Figure 6) component, wherein the upper wall (8; Figure 6) has a plurality of gas supply openings (10; Figure 6, 8), each of the gas supply openings (10; Figure 6, 8) formed into an upper

Art Unit: 1763

surface and out of a lower surface of the upper wall (8; Figure 6) such that each gas supply opening is defined by a corresponding interior surface of the upper wall (8; Figure 6), the gas supply openings (10; Figure 6, 8) being nonuniformly (Figure 8) distributed over the upper wall (8; Figure 6) to create a flow pattern that counteracts the tendency of the gas to flow toward the exhaust line (4; Figure 6), and thus promotes even processing over the upper surface of the wafer (2; Figure 6), as claimed by claim 29 – When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

- ii. The apparatus (Figure 6, 8; abstract) of claim 29 wherein the openings (10; Figure 6, 8) are more densely located on one side of the upper wall (8; Figure 6) than on another side thereof, as claimed by claim 30
- iii. The apparatus (Figure 6, 8; abstract) of claim 30 wherein the openings (10; Figure 6, 8) are substantially equal in size, as claimed by claim 31
- iv. The apparatus (Figure 6, 8; abstract) of claim 29 wherein the exhaust line (4; Figure 6) is connected at an exhaust location which is off-center with respect to a center point (geometric center of 8; Figure 8) of the wafer (2; Figure 6), when viewed from above, so that the gas exits out of the chamber (1; Figure 6; abstract) at the exhaust location which is off-center with respect to a center point (geometric center of 8; Figure 8) of the wafer (2; Figure 6), as claimed by claim 33
- v. The apparatus (Figure 6, 8; abstract) of claim 33 wherein a channel (present, not labelled; Figure 1) is defined within the chamber (1; Figure 6; abstract), the channel (present, not

Art Unit: 1763

labelled; Figure 1) being concentric with the wafer (2; Figure 6), gas flowing radially outwardly over the wafer (2; Figure 6) into the channel (present, not labelled; Figure 1), from the channel (present, not labelled; Figure 1), to the exhaust location into the exhaust line (4; Figure 6), as claimed by claim 34 – When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Itsudo does not teach a gas supply connected via a gas supply line opening formed through an upper surface of the manifold cavity.

Hsieh teaches a gas supply (70, 10a.etc.. ; Figure 1) connected via a gas supply line opening formed through an upper surface (80) of a manifold cavity (50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Hsieh's gas supplies and for Itsudo to optimize the relative location of his gas supply line opening.

Motivation to add Hsieh's gas supplies and for Itsudo to optimize the relative location of his gas supply line opening is to use process gas sources as precursors for operations and to optimize desired process gas flows as taught by Itsudo (abstract). It is well established that the rearrangement of parts is considered obvious to those of ordinary skill (In re Japikse , 181 F.2d 1019, 86 USPQ 70 (CCPA 1950); In re Kuhle , 526 F.2d 553, 188 USPQ 7 (CCPA 1975); Ex parte Chicago Rawhide Manufacturing Co. , 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).; MPEP 2144.04)

Art Unit: 1763

3. Claims 32, 35, 38, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itsudo et al (JP05-198512) and Hsieh; Chung-Ju et al. (US 6860138 B1) in view of Nguyen, Tue (US 6,444,039 B1). Itsudo and Hsieh are discussed above. Itsudo further teaches Itsudo's apparatus (Figure 6, 8; abstract) of claim 29 wherein Itsudo's exhaust line (4; Figure 6) is connected at an exhaust location which is off-center with respect to a center point of Itsudo's wafer (2; Figure 6), when viewed from above, so that Itsudo's gas exits out of Itsudo's wafer (2; Figure 6) at Itsudo's exhaust location which is off-center with respect to a center point of Itsudo's wafer (2; Figure 6), as claimed by claim 40. Itsudo further teaches Itsudo's apparatus (Figure 6, 8; abstract) of claim 40 wherein Itsudo's openings (10; Figure 6, 8) are formed to increase a flow rate of Itsudo's gas over Itsudo's wafer (2; Figure 6) farther from Itsudo's exhaust location, as claimed by claim 41 – When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Itsudo and Hsieh do not teach:

- i. Itsudo's apparatus (Figure 6, 8; abstract) of claim 29 wherein flow of gas in Itsudo's chamber (1; Figure 6; abstract) is laminar, as claimed by claim 32
- ii. Itsudo's apparatus (Figure 6, 8; abstract) of claim 34 wherein Itsudo's openings (10; Figure 6, 8) are more densely located farther from Itsudo's exhaust location, as claimed by claim 35
- iii. Itsudo's apparatus (Figure 6, 8; abstract) of claim 29 wherein there are first and second ones of Itsudo's openings (10; Figure 6, 8) on opposing sides of a point (geometric center of 8; Figure 8) on Itsudo's upper wall (8; Figure 6), Itsudo's first opening having a lower

Art Unit: 1763

end which is angularly displaced relative to an upper end thereof in a selected direction about Itsudo's point (geometric center of 8; Figure 8), and Itsudo's second opening having a lower end which is angularly displaced relative to an upper end thereof in Itsudo's selected direction, so that Itsudo's openings (10; Figure 6, 8) jointly create a circular gas flow pattern in Itsudo's chamber (1; Figure 6; abstract), as claimed by claim 38 – Applicant's Figure 4, 5 embodiment

- iv. Itsudo's apparatus (Figure 6, 8; abstract) of claim 38 wherein a third of Itsudo's openings (10; Figure 6, 8), on a side of Itsudo's second opening opposing Itsudo's first opening, has a lower end which is displaced in Itsudo's first direction relative to an upper end thereof, as claimed by claim 39

Nguyen teaches a portion (vertical part) of a gas distribution plate (111; Figure 10) including injection holes (117, Figure 10) with Applicant's claimed angular displacement as per Applicant's Figures 4, 5.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to angle Itsudo's gas supply openings (10; Figure 6, 8) as taught by Nguyen, further to process the wafer under laminar flow including optimized hole distributions as taught by Itsudo.

Motivation to angle Itsudo's gas supply openings (10; Figure 6, 8) as taught by Nguyen, further to process the wafer under laminar flow including optimized hole distributions as taught by Itsudo is for influencing flow patterns of Itsudo's process gases to achieve controlled CVD film thickness distributions as taught by Itsudo (abstract).

#### ***Response to Arguments***

Art Unit: 1763

4. Applicant's arguments with respect to claims 29-35, and 38-41 have been considered but are moot in view of the new grounds of rejection.

### ***Conclusion***

5. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the



Art Unit: 1763

examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at  
(571) 272-1435.

*Parviz Hassanzadeh*  
SP/5